WE CLAIM:

1. A coding apparatus for encoding data represented by input symbols into codes for serially transmitting the codes along a communication channel, the codes being represented in the channel by signals having a limited minimum and maximum pulse width and sampled by a receiver at each receiver's clock period,

wherein the 8 bit input symbols are encoded into a 12 bit output codes to have the minimum signal pulse width longer than one period of the receiver's sampling clock, the coding apparatus comprises:

a means for generating a coding table wherein two symbols are coded in conjunction with one another, the coding table comprising 466 symbols grouped into 233 pairs so that, within each pair, one symbol is complementary to another one, to obtain the coding table comprising only 233 symbols such that no one symbol is complementary to another symbol; and

a means for partitioning the obtained coding table comprising 233 symbols into three groups of symbols such that:

- a first group comprises one symbol only, wherein all bits are the same;
- a second group comprises symbols in which two least bits are the same;
- a third groups comprises symbols in which the two least bits are opposite.

2. A coding apparatus according to claim 1, wherein the coding table is compiled so that the most significant bit (MSB) is "0".

3. A coding apparatus according to claim 1, wherein the input symbols are coded to have a minimum signal pulse width which is at least twice longer than one period of the receiver's sampling clock.

4. A coding apparatus according to claim 1, wherein the code table comprises 1 symbol in the first group, 143 symbols in the second group and 89 symbols in the third group.

5. A coding apparatus according to claim 1, wherein a code table is created wherein the order of symbols within each group is changed to optimise the amount of logic required, or for some other purposes.

6. A coding apparatus according to claim 1 wherein the code table is reordered to provide the optimal coder implementation such as having small or minimal logical terms.

7. A coding apparatus according to claim 1, implemented in hardware.

8. A coding apparatus according to claim 1 when used in a hub, a switch, router, modem, processor, CD or in a disc driver.

9. A method of coding data represented by 8 bit input symbols into 12 bit output codes for transmitting along a communication channel comprising a transmitter for serially transmitting codes represented in the channel by signals having a limited minimum and maximum pulse width and a receiver for sampling data at each clock period, wherein two input symbols, A and B, are encoded to have the minimum signal pulse width longer than one period of the receiver's sampling clock, into two output symbols, C and D, such that the symbol transmitted first is referred to as C and the symbol transmitted second is referred to as D, the method comprising the steps of:

generating a coding table wherein two symbols are coded in conjunction with one another, so that the coding table comprises 466 symbols grouped into 233 pairs and, within each pair, one symbol is complementary to another one, to obtain the coding table comprising only 233 symbols such that no one symbol is complementary to another symbol; and

partitioning the obtained coding table comprising 233 symbols into three groups of symbols such that:

- a first group comprises one symbol only, wherein all bits are the same;
- a second group comprises symbols in which two least bits are the same;
- a third groups comprises symbols in which the two least bits are opposite.

10. A method as claimed in claim 9, wherein the bits of symbol D are transmitted through the channel serially in the order opposite to the order of bits when transmitting symbol C.

11. A method as claimed in claim 9, wherein symbol C is taken from the first group or from the second group, and is followed by symbol D taken from the second group.

12. A method according to claim 9, wherein symbol C ends with two identical bits and symbol D starts with two identical bits.

13. A method according to claim 9, wherein if symbol A is greater or equal to 36, and symbol B is also greater or equal to 36, then:

- symbol C is taken from the above described coding table under the number equal to A - 35, while
- symbol D is taken from the same table under the number B – 35;

the polarity of the first bit of the symbol D coinciding with the polarity of the last bit of symbol C so that there is no transition between symbols C and D.

14. A method according to claim 9, wherein if symbol A is less than 36, then:

- symbol C is taken from the coding table under the number A x 4 + (B modulo 2), while
- symbol D is taken from the same table under the number B/2, so that

symbol C is selected from the first or the second group only, and symbol D is also taken from the first or the second group only; and

symbol D is transmitted complementary to symbol C selected from the table, so that there is a transition between symbols C and D.

15. A method according to claim 9, wherein if symbol A is greater or equal to 36, but symbol B is less than 36, then:

- symbol C is taken from the coding table under the number Bx4 + (A modulo 2) +2; while
- symbol D is taken from the same table under the number A/2;

wherein symbol D is transmitted complementary to symbol C selected from the table, so that there is a transition between symbols C and D.

16. A method according to claim 9, wherein the obtained pairs C and D are further processed to avoid single bit interval pulse on the boundary of pairs.

17. A method according to claim 9, wherein, if the first bit of symbol C is opposite to the last bit of previously transmitted symbol D, the new symbols C and D are transmitted complementary.

18. A method according to claim 9, wherein if the two last bits in previous symbol D are the same, and the two first bits of the next symbol C are the same, then, the whole new pair C and D shall be transmitted complementary further.

19. The method as claimed in claim 9, further comprising a step of decoding output codes to obtain respective output symbols.

20. A communication apparatus for transmitting and receiving digital data, comprising:

- a coder for coding data represented by input symbols into codes;
- a transmitter for serially transmitting along a communication channel the codes represented in the channel by signals having a limited minimum and maximum pulse width; and
- a receiver for sampling data signals at each clock period,

wherein the coder codes 8 bit input symbols into a 12 bit output codes to have the minimum signal pulse width longer than one period of the receiver's sampling clock, the coder further comprising:

- a means for generating a coding table wherein two symbols are coded in conjunction with one another, the coding table comprising 466 symbols grouped into 233 pairs so that, within each pair, one symbol is complementary to another one, to obtain the coding table comprising only 233 symbols such that no one symbol is complementary to another symbol; and
- a means for partitioning the obtained coding table comprising 233 symbols into three groups of symbols, the first group comprising one symbol only, in which all bits are the same; the second group comprising symbols in which two least bits are the same; and the third group comprising symbols in which the two least bits are opposite.